

## Federal Reserve Bank of Cleveland

# Why Are We Losing Manufacturing Jobs?

by Eric O'N. Fisher

Rapid technological progress in manufacturing has led to higher wages and rising standards of living for over two centuries, but in the last 50 years it has also reduced the need for manufacturing labor. The primary source of American prosperity is no longer manufacturing; ours is now an increasingly service-oriented economy in which innovations in high-tech sectors and other professional services are the most important sources of future prosperity.

The United States has the highest long-term underlying rate of economic growth in the world. A conservative estimate is that the standard of living of the average American doubles every 30 years. But an economy undergoing rapid technological progress is one in which some sectors are booming and others are senescent. For example, water transport was a primary source of prosperity for Ohio for several generations after the opening of the Erie Canal. The advent of a national network of railroads at the end of the nineteenth century signaled the end of a way of life for many whose livelihood depended upon inland water transportation. But there can be no doubt that knitting together a national market—first by rail and then by road—gave a tremendous boost to the economic growth that our country enjoyed in the last century.

We are now at a similar crossroads in economic history. Manufacturing—the transformation of tangible substances into more refined commodities—is no longer a primary source of prosperity. The percentage of people employed in manufacturing in the United States has declined steadily since the 1960s, from 25 percent

then to less than 12.5 percent today. And the United States is not the only country to have experienced a relative decline in manufacturing employment; the same trend has been part of the economic history of almost every advanced economy in the last two generations.

The declining need for workers in a sector that has traditionally provided good jobs has naturally generated concern and calls for appropriate public policy. Blame for the decline is most often placed on “globalization” in general, or the outsourcing of jobs to other countries in particular. Some see the shifting of jobs from one state to another and conclude that variation in economic policies (for example, taxes) is the problem. Deal with these issues, people imagine, and we will be able to preserve manufacturing jobs.

But factors such as globalization and state policies account for only the tiniest portion of the change. A clue to the true source of the shift in manufacturing employment is the fact that all developed countries are witnessing the same trend. What that trend tells us is that the primary cause of the decline in manufacturing employment in advanced economies is the inexorable march of technological progress.

## ■ The New Face of Manufacturing Employment

Figure 1 and table 1 illustrate the major features of the employment trend we are discussing. Figure 1 demonstrates clearly that the relative share of manufacturing employment has fallen steadily and substantially in our country for at least 50 years. Table 1 shows that the decline in the share of workers in manufacturing is occurring in all major advanced economies. The table also

**In the last 50 years, the share of employment in manufacturing has declined in the United States. The main reason for this phenomenon is labor-saving technological progress. Variation among state tax policies and international economic conditions have played only minor roles. The source of future prosperity will be technological advances in a service-oriented economy.**

shows that some of the countries that have experienced the most rapid increases in their standards of living in the last two decades are those whose shares of employment in manufacturing have dropped most substantially. There is even some preliminary evidence that this is true for the less developed countries in the last few years (“Constraints to Achieving Full Employment in Asia,” by Dipak Mazumdar, International Labor Organization, Employment and Training Papers, no. 51, 1999, table 2).

Focusing on economic activity in manufacturing gives a different perspective. The data on real gross state product in manufacturing for the last 15 years show that economic activity in manufacturing in the United States is not declining in absolute terms. It is declining *as a share of the national economy*, and its employment share is declining because of rapid increases in productivity among manufacturing workers.

Industries classified by the Bureau of Labor Statistics as manufacturing are diverse, ranging from retail bakeries to petrochemical refineries. They do not

include mining, construction, or transportation activities. It is important to bear in mind that any category of economic statistics is to some extent arbitrary, but it is perhaps safe to say that manufacturing jobs have been desired in the last two or three generations because they paid fairly well and did not typically require a college education.

But while many people still view skilled manufacturing jobs as an abundant local source of high-paying employment, the connection has not held for some time. Figure 2 gives a dramatic illustration of the link between high real wages and the share of employment in manufacturing.

This figure shows the relationship between manufacturing employment shares and real wages in each state for the years 1960 through 2002. Each observation is adjusted by subtracting the state-specific average across the 43 years in the sample. This technique makes high-wage states and low-wage states comparable; likewise, it allows one to compare states dependent on manufacturing with those that have smaller manufacturing bases. The relationship between wages and manufacturing jobs is perhaps not what the average person anxious about the changing economic landscape would expect: High real wages are associated with *lower* employment shares in manufacturing, even if one controls for the fact that some states are more dependent upon manufacturing employment than others.

### ■ Three Possible Causes for the Decline

What has caused the decline in manufacturing employment, and should anything be done about it? To help answer this question, we can investigate the explanations most frequently proffered—globalization, variations in state policies, and technology—and ascertain how much each of these factors has contributed to the loss of manufacturing jobs.

Figure 2 is strong evidence that the United States economy has undergone a period of impressive technological progress in the last four decades. A plausible explanation for the data is that there is a distribution of skills among manufacturing jobs. Wages are correlated with skill levels, and many formerly low-skilled manufacturing jobs are now being done abroad.

Many people argue that international competition is an important cause of the loss of manufacturing jobs. They maintain that American firms are outsourcing because foreign wages are a lot lower than domestic wages. But the same argument was also true at an earlier time for a general decline of manufacturing jobs in the industrial Northeast, as companies moved operations to the South and West, where unit costs were lower in the middle part of the twentieth century.

There is a grain of truth to the argument that foreign competition has eroded the domestic manufacturing base in the last 30 years. But an equally important source of the loss of manufacturing jobs for some states has likely been high local state tax burdens that domestic manufacturing enterprises face *within* the United States. This conclusion is true whether one focuses on the share of employment in manufacturing or on economic activity in manufacturing more generally.

To evaluate the impact that differences in state policies have on manufacturing employment, we will focus on one policy that arguably affects businesses the most—taxes. State-specific taxes consist of several different dimensions: income taxes, sales taxes, property taxes, estate taxes, and a wide array of other taxes, some of which fall particularly on manufacturing enterprises.

It is difficult to come up with one number that summarizes all of these considerations for each state in a given year, but data from the Tax Foundation provide a good benchmark. They can be used to compare the different policies of the states as well as their effects.<sup>1</sup> For example, the foundation calculated the tax burden in Ohio in 1970 to be 7.9 percent, but by 2003 it had risen to 10.3 percent. A 2.4 percent rise over almost a quarter-century may not seem like much, but a comparison with other states shows in essence that Ohio went from being a state with a fairly modest tax burden in 1970 to a state with a high tax burden by 2003.

One can also use data on gross state product to calculate the rate of indirect taxes paid by manufacturing enterprises in each state from 1986 through 2001. Indirect business taxes include many different items, and these rates vary from a 16-year average of 1.6 percent for Alabama to 8.9 percent for Kentucky. The analogous rate for Ohio is 2.6 percent.

To evaluate the effect of globalization, we can take a look at the real exchange rate—an economywide financial variable that affects every firm's ability to export. The real exchange rate relates the price of exports to that of imports. It has three parts: the price of domestic goods, the price of foreign goods (measured in foreign currency), and the dollar price of foreign exchange.

It is also a simple measure of international competitiveness. If the real exchange rate appreciates, it means that domestic firms are losing international competitiveness because the dollar is strong or domestic goods are relatively expensive. When this happens, American firms are more likely to outsource because sources of supply abroad are relatively inexpensive. There is no doubt that domestic firms have suffered a loss in international competitiveness in the last decade, when a broad measure of the dollar made imports about 20 percent less expensive.

### ■ What the Statistical Analysis Tells Us

Statistical analysis shows that the real exchange rate and the local state tax burden do have a small but statistically significant influence on the share of manufacturing employment. (The statistical technique is called panel regression. It exploits the variability across time and states to estimate the partial correlation between manufacturing employment share and a proxy for technological progress, taxes, and the real exchange rate.)

Still, increases in productivity due to technological advances have the greatest effect by far. During the 1990s, technological progress caused about a 3.3 percent decline in the share of manufacturing employment, while the large appreciation of the dollar is associated with 0.24 percent drop, and the measured rise in Ohio's tax burden is associated with a decrease of 0.42 percent.

Technological progress is thus eight times as important as the slow and seemingly relentless rise in the overall tax burden in the state. Also, the rise in the tax burden is almost twice as important as the increase in international competition. State taxes and international economic conditions have much smaller effects than the march of technological progress.

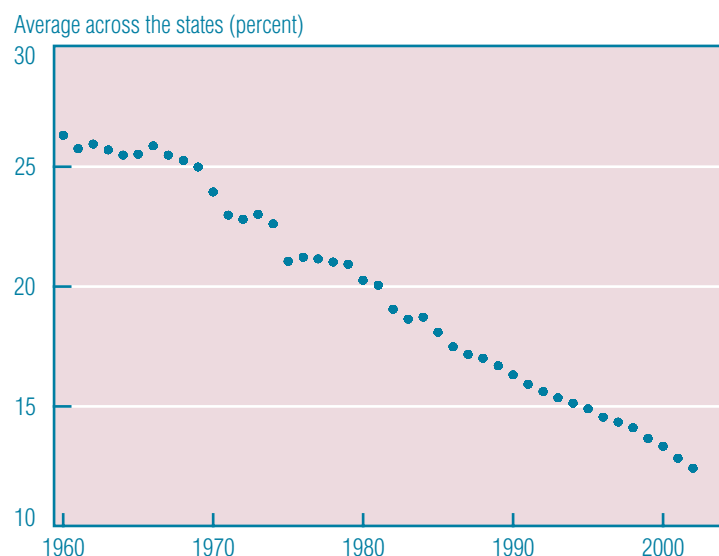
**TABLE 1 MANUFACTURING EMPLOYMENT SHARES IN SOME ADVANCED COUNTRIES (PERCENT)**

	1960	2002	Average annual growth rate
United States	26	13	2.1
Canada	25	15	1.7
Australia	26	12	1.9
Japan	22	19	2.2
France	28	21	1.5
Germany	34	24	1.8
Italy	24	23	1.7
Netherlands	29	14	1.9
Sweden	32	17	1.5
United Kingdom	36	16	2.1

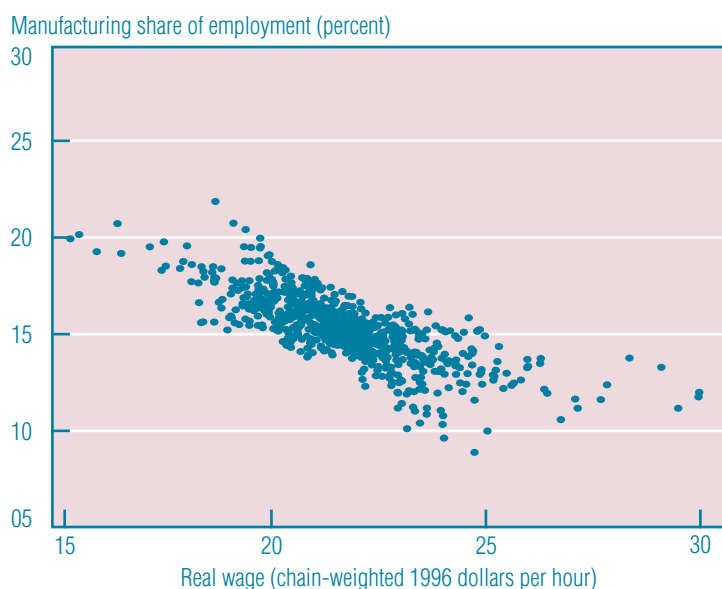
**SOURCES:** U.S. Department of Labor and Penn World Table.

**NOTES:** The data for Australia start in 1965, and the data for France stop in 1989. The growth rates are of chain-weighted GDP for the years 1980 through 2000 inclusive. The annual growth rate is the rate of real economic growth compounded annually.

**FIGURE 1 SHARE OF EMPLOYMENT IN MANUFACTURING**



**FIGURE 2 MANUFACTURING EMPLOYMENT AND REAL WAGES (CONTROLS FOR STATE FIXED EFFECTS)**



## What Can Be Done

For more than 200 years, it has taken three skilled musicians about 20 minutes to perform Beethoven's trio for clarinet, cello, and piano in B-flat major (Opus 11). When this work was written at the end of the eighteenth century, only the most privileged members of society could afford to hear live chamber music, but now one can buy a ticket to hear world-class musicians for \$18, about the hourly wage of a manufacturing job. In 1798, when Beethoven's trio was first performed, the "price" of a radio that played classical music was essentially infinite because only visionaries might have dreamed that telecommunication using the principles of electromagnetism was even possible. One can buy a good radio now for less than \$20.

The general rise of disposable income in a prosperous modern economy causes an increased demand for services such as health care, tourism, and other leisure activities. So it should be no surprise that a smaller share of the workforce has been employed in manufacturing in the last several decades.

It is probably not desirable to interfere with the general forces that give rise to economic prosperity, and there is even some evidence that countries that attempt to maintain manufacturing employment may do so at the expense of economic prosperity. The effects of the real exchange rate or local tax burdens on the shift in employment from manufacturing to the service sector are quite small relative to the rate of advancement of technological progress. Thus there may be little gain, if any, in gearing public policy to offset these ancillary influences on economic activity in manufacturing. Perhaps state legislatures should be concerned with how tax burdens and other economic factors influence the local business climate in the new service-oriented national economy.

## Footnotes

1. The Tax Foundation's Web page is [www.taxfoundation.org](http://www.taxfoundation.org).

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*The views expressed here are those of the authors and not necessarily those of the Federal Reserve Bank of Cleveland, the Board of Governors of the Federal Reserve System, or its staff.*

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